

Applicants acknowledge with thanks the indication in the Written Opinion that Claims 12 and 13 possess novelty and inventive step. Applicants also acknowledge with thanks the indication in the Written Opinion that all claims possess industrial applicability.

Applicants have amended the Specification and Claims 5 and 12 to remove typographical errors. Applicants have also amended Claim 2 to be in independent form, and Claims 3, 4, 6, 7, 9-11 and 14-16 to depend from either Claim 1 or 2. Applicants have presented fresh pages reflective of these amendments introduced hereby pursuant to PCT Article 34.

Applicants' Response to
the PCT Article 33(2) and (3) Objections

Claims 1-11 and 14-23 stand objected to under PCT Article 33(2) as lacking novelty, as allegedly being anticipated by U.S. Patent No. 5,516,812 (Chu) and under PCT Article 33(3) as lacking inventive step, as allegedly being obvious over Chu. The reasoning supporting these objections is set forth in box V.2 of the Written Opinion.

Applicants' respectfully traverse the reasoning supporting these objections.

For the sake of review and for the Authorized Officer's benefit, Applicants provide a brief description

of the present invention, and the commercial problems that existed for which this invention provides a solution.

The present invention is directed to resin-reinforced silicone compositions curable upon exposure to radiation in the electromagnetic spectrum, which compositions when cured demonstrate improved elastomeric properties, such as tensile strength, modulus and elongation. The inventive resin-reinforced silicone compositions may alternatively be rendered curable by exposure to moisture. In addition, the inventive compositions may be rendered curable by exposure to radiation in the electromagnetic spectrum, and exposure to moisture. The inventive silicone compositions are particularly well suited for use in electronic conformal coating and potting applications, as well as in automotive gasketing applications, pressure sensitive adhesive applications and the like.

More specifically, the present invention is defined by (a) a polyorganosiloxane, having photocurable groups, such as (meth)acrylate or glycidoxyl functionality, like methacryloxypropyl, vinyl ether groups and the like and/or moisture curable groups, such as alkoxy or aryloxy groups, like methoxy, acetoxy groups, oximino groups, enyloxy groups, imido groups, amino groups, and the like; (b) a silicone resin selected

from (i) those formed from at least one silane within the formula $R^1_m R^2_p Si(X)_{4-(m+p)}$ I, where R^1 is a (meth)acrylate functional group or a hydrolyzable group, and R^2 may be the same or different and may be selected from monovalent ethylenically unsaturated radicals, hydrogen, C_{1-12} alkyl, C_{6-12} aryl, C_{7-18} alkylaryl, or a hydrolyzable group, X is a hydrolyzable group, m is an integer from 1 to 3, and $m+p$ is an integer from 1 to 3; (ii) those formed from at least one silane within the formula $R^3_q Si(X)_{4-q}$ II, where R^3 may be the same as or different from R^2 above and may be selected from monovalent ethylenically unsaturated radicals, hydrogen, C_{1-12} alkyl, C_{6-12} aryl, and C_{7-18} alkylaryl, and q is an integer from 1 to 3, reacted with at least another silane within the formula of $R^4_r R^5_s Si(X)_{4-(r+s)}$ III, where R^4 and R^5 may be the same or different and may be selected from monovalent ethylenically unsaturated radicals, hydrogen, C_{1-12} alkyl, C_{6-12} aryl, C_{7-18} alkylaryl, r is an integer from 1 to 3, and $r+s$ is an integer from 1 to 3, provided the silicone resin formed contains at least some hydrolyzable group, X ; and combinations thereof; and (c) a photoinitiator, moisture cure catalyst, and combinations thereof.

In a particularly desirable aspect of the invention, the silicone resin is formed as the reaction product of: (i) at least one silane within the formula $R^1_m R^2_p Si(X)_{4-(m+p)}$ I, where R^1 is a (meth)acrylate functional

group or hydrolyzable group, and R^2 be the same or different and may be selected from monovalent ethylenically unsaturated radicals, hydrogen, C_{1-12} alkyl, C_{6-12} aryl, C_{7-18} arylalkyl, C_{7-18} alkylaryl, or a hydrolyzable group, X is a hydrolyzable group, m is an integer from 1 to 3, and m+p is an integer from 1 to 3, and (ii) at least one other silane within the formula $R_nSi(X)_{4-n}$ IV, where R may be the same or different and may be selected from monovalent ethylenically unsaturated radicals, hydrogen, C_{1-12} alkyl, C_{6-12} aryl, C_{7-18} arylalkyl, C_{7-18} alkylaryl, haloalkyl, and haloaryl, X is a hydrolyzable functionality, and n is an integer of from 0 to 3. This has been reflected by changing Claim 2 to read independently from Claim 1.

The Written Opinion cites Chu in support of the PCT Article 33(2) and (3) objections.

Chu is directed to radiation and moisture curable silicone compositions having a vinyl-terminated silicone fluid, a radiation and moisture curable silicone fluid, and a photoinitiator. Chu speaks to silicone fluids, which are readily recognized as polymers that are linear. That is, the silicone fluids of Chu are described to be end-capped and linear in structure (see e.g., col. 3, lines 38-61), indicating that these silicone fluids react through their terminal ends to form

a cured product that extends through the ends in a linear manner.

In contrast, the present invention employs a polyorganosiloxane and silicone resin, together with a cure catalyst. The polyorganosiloxane is comparable to the silicone fluid of Chu, in that it is a linear silicone polymer with reactive end groups. Reference to the specification at page 9, line 23 et seq. describes a polyorganosiloxane being linear with a molecular size of about 50 siloxane units, and certain reactive groups on the terminal ends. Page 10, line 17 indicates that "[g]enerally, it is convenient to use a linear polyorganosiloxane having (meth)acrylate groups terminating the silicone."

However, Applicants define the silicone resin in very particular ways (see above and Claims 1 and 2), which are not taught, disclosed or suggested by Chu.

The silicone resin is used in the present invention to provide reinforcement in the cured reaction product. The reinforcing ability comes from the non-linear structure of these resins and the functional groups that may react with the functional groups on the polyorganosiloxane.

A review of the Examples section of the Specification will readily point out the superior results obtained when using the silicone resins as defined in the

subject application to provide reinforcement to the cured reaction products formed from the polyorganosiloxane and silicone resin.

A recent treatise [M.A. Brook, Silicon in Organic, Organometallic, and Polymer Chemistry, p. 319, J. Wiley & Sons, Inc., New York (2000)*, copy attached] refers to the use of MQ resins (a common way of describing silicone resins generally, see also Specification, page 4, line 23 - page 5, line 2) as "'spidery' 3D structures" and as being "useful materials for reinforcing silicones".

Thus, Applicants respectfully submit that Chu speaks to the use of two silicone fluids (see e.g. Claim 1 thereof), having linear structures with reactive end groups. Chu does not however disclose, teach or suggest the use of a silicone resin, particularly as defined herein, as that term is known in the art and used by Applicants as a three dimensional, networked silicone-based structure. Nor does Chu disclose, teach or suggest the use of a silicone resin to reinforce a silicone composition once cured through a reaction between reactive groups on the polyorganosiloxane and the silicone resin.

* Of course, this treatise is dated after the filing date of the subject application, and does not refer to the type of functionalized - UV and/or moisture curable - polyorganosiloxanes or functionalized silicone resins as Applicants have set forth in the claimed invention.

In fact, while the Search Examiner indicated Chu to be a "Y" document, which expressly requires a second document to form the basis of an inventive step objection, the Authorized Officer has used Chu as a document to support the novelty objection (which as demonstrated above should be withdrawn) and as regards inventive step the Authorized Officer has provided no such second document to support the objection.

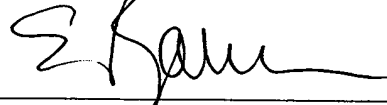
As such, reconsideration and withdrawal of the PCT Article 33(2) and (3) objections are respectfully requested.

CONCLUSION

Applicants respectfully submit that in view of the above, the subject application is in condition for a favorable International Preliminary Examination Report. As such, Applicants respectfully request issuance of such a report.

Otherwise, the Authorized Officer is encouraged to contact Applicants' undersigned agent by telephone at (860) 571-5001 or by facsimile at (860) 571-5028. All correspondence should now be directed to the address given below.

Respectfully submitted,



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